

WHAT IS CLAIMED IS:

1. An electronic control unit for transmitting pulse-width-modulated data signal for communicating with an external unit comprising:

a PWM output unit for generating pulses each of which has a predetermined on-period and a predetermined off-period; characterized by further comprising

a setting unit for executing an interrupt process at an edge time of each of the pulses and setting in the interrupt process a pulse-width-modulated output pattern of the data signal which is to be transmitted thereafter.

2. An electronic control unit as in claim 1, wherein:

the setting unit variably sets at least one of a cycle period, an on-period and an off-period of a next cycle of the pulses.

3. An electronic control unit as in claim 2, wherein:

the setting unit sets the cycle period variably for each cycle of the pulses.

4. An electronic control unit as in claim 1, wherein:

the PWM output unit generates an interrupt request between two successive pulses; and

the setting unit executes the interrupt process in response to the interrupt request.

5. An electronic control unit as in claim 4, wherein:
the setting unit checks, when the interrupt request is generated, whether a response has been received from the external unit.

6. An electronic control unit as in claim 4, wherein:
the PWM output unit generates a dummy signal fixed to an off level and generates the interrupt request at an imaginary edge time of the dummy signal.

7. The electronic control unit as in claim 1, wherein:
the setting unit drives the PWM output unit to transmit the pulses in a plurality of stages to the external unit, the pulses being codes specific to a vehicle to check whether the external unit is authorized;

the setting unit checks whether a response from the external unit has been received at every stage of code transmission; and

the setting unit disables a code transmission in a next stage when no response from the external unit has been received.

8. A communication method between a vehicle and a portable transmitter/receiver unit comprising the steps of:

transmitting, in each of a plurality of transmission stages, a transmission signal from an in-vehicle computer having a pulse-width-modulation output unit for checking authority of the transmitter/receiver;

generating an interrupt request each time an inquiry signal is transmitted; and

variably setting a pattern of the transmission signal in response to the interrupt request by changing at least one of a cycle period, on-period and off-period of a next transmission signal, so that the variably set next transmission signal is generated from the pulse-width-modulation output unit.

9. A communication method as in claim 8, further comprising the steps of:

transmitting a response signal from the portable transmitter/receiver unit in response to a completion of signal transmission of each stage from the vehicle; and

stopping a transmission of transmission signals from the vehicle when no response signal is received from the portable transmitter/receiver unit.

10. A communication method as in claim 8, wherein:

the transmission signal transmitting step transmits a plurality of transmission signals in each stage; and

the pattern setting step sets the pattern of each transmission signal in each stage.